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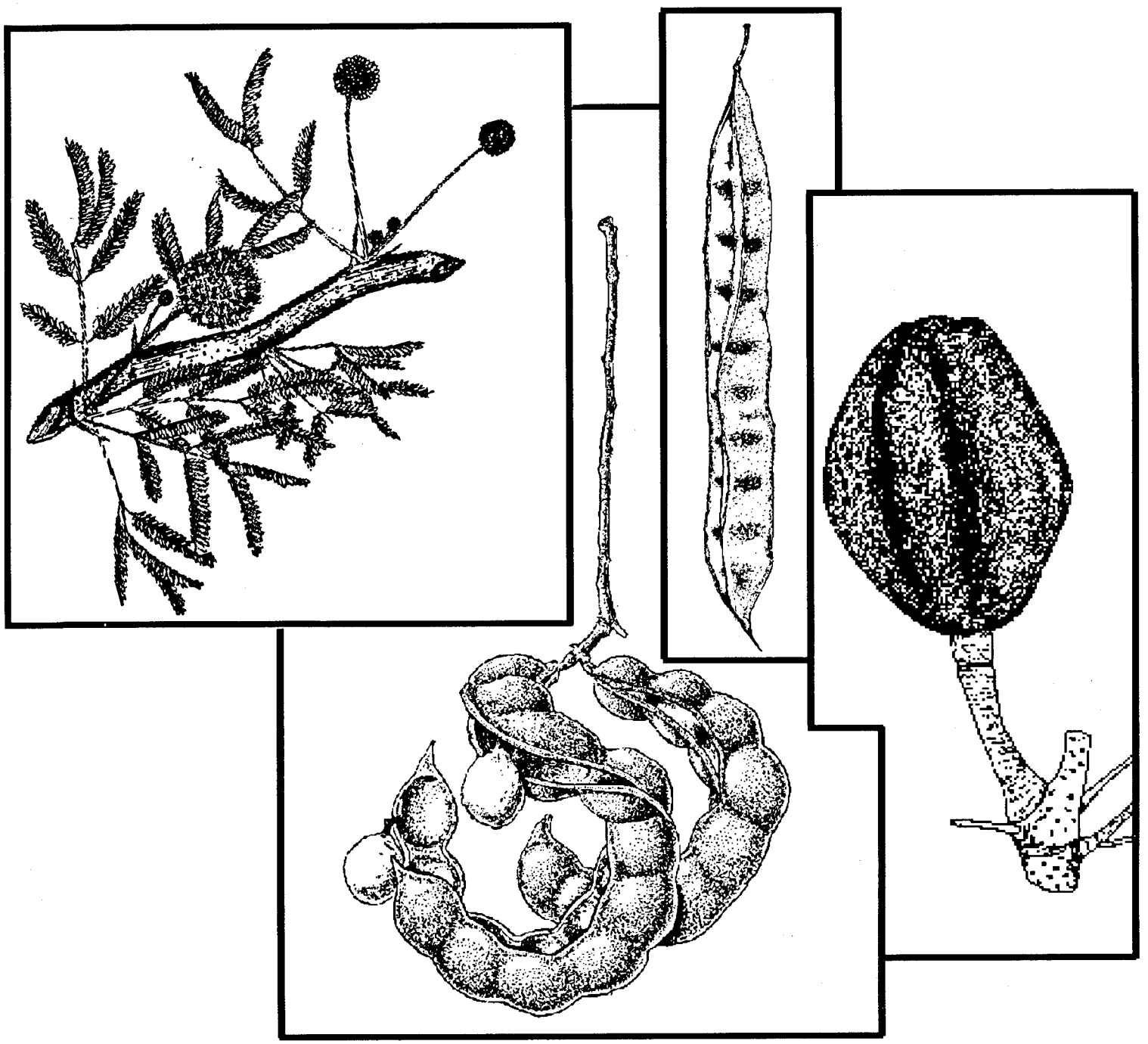
Naturalized Exotic Tree Species in Puerto Rico

John K. Francis and Henri A. Liogier



SUMMARY

Many exotic tree species have been imported into Puerto Rico for their wood, fruit, and use as coffee shade and ornamentals. Some of these trees have naturalized (reproduced without human intervention) and some have escaped into natural forests. At least 118 exotic species are reproducing in Puerto Rico. Estimates are given for the general rate of spread and future abundance of each species as well as the environmental requirements. Species that are abundant, widespread, and competing in natural stands, as well as those likely to do so in the future, are identified.

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INTRODUCTION

The mountains of Puerto Rico rose above the sea in the late Eocene or early Oligocene (approximately 40 million years ago), and since that time a tree flora of 542 native species has accumulated (Little and others 1974). Most of the original species were probably brought in from other land masses by birds. One hundred and nine endemic species evolved in Puerto Rico or remained here after extinctions elsewhere. Several species, particularly fruit-bearers, were undoubtedly imported by pre-Columbian native people.

The expansion of the tree flora continued even after the arrival of Columbus in 1493. Early European settlers and traders brought in a number of useful tree species, and a few species may have been introduced accidentally. About 45 of these species are now successfully reproducing in the wild. In the last century there has been a spate of introductions for ornamental, coffee shade, fruit, wood, and other utilitarian purposes. About 35 species imported as ornamentals and about an equal number imported for forestry or agricultural tests have naturalized.

The species naturalized in Puerto Rico have come from tropical and subtropical areas all over the world. Forty-seven percent (55) originated in the New World. Eleven percent (13) of the species came from Africa and adjacent Mediterranean shores, and 42 percent (50) are Asian, mostly from India to Oceania.

Naturalized exotic tree species are listed in table 1. The principal reference used for scientific names was Liogier and Martorell (1982). For convenience, all species present in Puerto Rico before the arrival of Columbus are considered native and all that arrived after 1493 are considered exotic. It is not known if *Annona muricata* L., *Hura crepitans* L., *Inga vera* Willd., and *Leucaena leucocephala* (Lam.) de Wit. were pre-Columbian; therefore they have been arbitrarily considered to be native and are not included in table 1. Another species, *Albizia carbonaria* Britton, is reported (Little and others 1974) to have naturalized, but was not observed while research was being done for this publication. Soil parameters and components of projected spread, put as a footnote in table 1, are subjective estimates based on observations of current reproduction of these species in the field.

HOW TREE SPECIES BECOME NATURALIZED

A tree species is considered naturalized when it has reproduced (generally from seed) and grown to at least sapling size, without the deliberate aid of humans. Three degrees of integration into the local flora have been observed in Puerto Rico. Species demonstrating the highest degree of integration are able to escape from the vicinity of the original planting and compete in primary forests. Examples are *Syzygium jambos* (L.) Alst. in moist and wet forests and *Swietenia mahagoni* (L.) Jacq. in dry forest areas. It is not yet clear in most cases which species will be able to survive and reproduce in primary forests, but there are probably no more than 10 to 15 of the presently naturalized species that will ultimately do so. The dry and moist coastal forests seem the most vulnerable to invasion. In the second degree of integration, competitive generalists have entered the secondary forest or seem likely to do so eventually. These species are mostly fast growing, intolerant of shade, and have an effective transport system. Good examples are *Spathodea campanulata* Beauv., *Pithecellobium dulce* (Roxb.) Benth., and *Senna spectabilis* (L.C. Rich.) Irwin and Barneby (fig. 1). Many species of this group are still largely confined to roadsides and abandoned farms (fig. 2). The third degree of integration is seen in species that have reproduced infrequently or only incidentally, are almost totally dependent on human-caused disturbance, and seem unable to compete in secondary forests. These seedlings are found near the original parent trees in yards, parks, and farms.

IMPACTS OF NATURALIZED TREE SPECIES

The invasion of exotic tree species is studied because there is a need to know what potential impacts these species may have on man and native plant communities.

John K. Francis is research forester at the Institute of Tropical Forestry, U.S. Department of Agriculture, Forest Service, Southern Forest Experiment Station, Rio Piedras, PR 00928, in cooperation with the University of Puerto Rico, Rio Piedras, PR, and Henri A. Liogier is taxonomist at the Botanic Garden, University of Puerto Rico, Rio Piedras, PR 00928.

The naturalization of trees can result in either a negative or positive economic impact. *Albizia procera* (Roxb.) Benth. has invaded many pastures in Puerto Rico, seriously reducing productivity, and has been expensive for cattle ranchers to control. Conversely, natural reproduction of valuable timber species such as *Pinus caribaea* Morelet (fig. 3) and *Swietenia macrophylla* G. King in plantations eliminates the cost of replanting after harvest. There may be ecological impacts as well. Extinction or population declines of native plant or animal species could be the result of the invasion of a tree species under certain circumstances. As yet, neither has been documented in Puerto Rico. Each new addition to the plant community increases the local biological diversity. Tree species that remain noncompetitive or rare are of little concern, while those that become abundant and spread widely are more likely to have a significant impact. Species that have already become widespread and common or abundant are listed in table 2; those that are likely to do so within the next century are listed in table 3.

Figure 1.— *Solid stand of* Senna spectabilis *that has invaded a former dry pasture near Penuelas, Puerto Rico.*

Figure 2.— *Naturalized* Senna Siamea *and* Melicoccus bijugatus *with native* Ficus citrifolia *on roadside near Coamo, Puerto Rico.*

Figure 3.— *Seedlings of* Pinus caribaea *invading an abandoned field next to a plantation in western Puerto Rico.*

Table 1—*Naturalized and escaped exotic trees in Puerto Rico*

Scientific name	Common name	Area of origin	Location of reproduction; number of plants or area covered	Requirements		Rate of spread[‡]
				Rainfall	Soil properties[•]	
Acacia farnesiana (L.) Willd.	Sweet acacia, aroma	Probably area near the Mediterranean Sea	Dry coastal areas and offshore islands; more than 1000 hectares	600–1150 mm	6.0–9.0 N– M, D	3C
Acacia mangium Willd.	Mangium	Australia, New Guinea, and Molucca	Río Piedras; less than 100 plants	1500–2200 mm	5.0–7.0 N– P, M	2I
Acacia nilotica (L.) Delile	Gum arabic, goma arabica	Tropical Africa and Asia	Dry coastal areas, near ornamental plantings; less than 100 hectares	600–1300 mm	6.0–8.0 NO M, D	1I
Adenanthera pavonia L.	Jubie-bead, peronias	Tropical Asia	St. Just, Cambalache, Guajataca; less than 100 hectares	1300–2100 mm	5.0–7.5 N+ M	2 to 3C
Agathis robusta (F. J. Muell.) F. M. Bailey	Queensland kauri	Queensland, Australia, and Papua, New Guinea	Maricao; less than 10 hectares	1400–3500 mm	4.5–8.0 N– P, M	2R
Albizia adinocephala (Donn. Sm.) Britt. & Rose	Chipite	Central America	Mayaguez; more than 1000 plants	1500–3000 mm	5.0–7.0 N– P, M	4C
Albizia lebbek (L.) Benth.	Lebbik, tibit	Tropical Asia	Dry areas and offshore islands; more than 1000 hectares	640–1700 mm	5.0–8.0 N– M, D	2C

Table 1—*Naturalized and escaped exotic trees in Puerto Rico—Continued*

Scientific name	Common name	Area of origin	Location of reproduction; number of plants or area covered	Requirements		Rate of spread[†]
				Rainfall	Soil properties[*]	
Albizia procera (Roxb.) Benth.	White seris, albizia	India to Australia	Moist coastal plains and foothills; more than 1000 hectares	900–2400 mm	4.5–7.5 NO P, M	4A
Aleurites fordii Hemsl.	Tung-oil tree, palo de aceite	China	Limestone hills; less than 1000 plants	1500–2225 mm	5.0–7.5 NO M	1R
Aleurites moluccana (L.) Willd.	Candlenut, nuez de veila	Malaya to Australia	Luquillo Mountains and limestone hills; more than 1000 plants	1500–3400 mm	5.0–7.5 NO P, M	2R
Anthocephalus chinensis (Lam.) A. Rich. ex Walp.	Kadam	India and China to Australia and Philippines	Río Abajo and Río Piedras; more than 1000 plants	1600–3000 mm	5.0–7.5 N+ P, M	2R
Ardisia solanacea Roxb.	Blackberry	India	Moist areas; more than 1000 hectares	1500–2500 mm	5.0–7.0 N+ P, M	4A
Artocarpus altilis (S. Park.) Fosb.	Breadfruit, pana	Oceania	Formerly cultivated lands; less than 1000 hectares	1500–3000 mm	4.8–7.5 N+ P, M	2C
Artocarpus heterophyllus Lam.	Jack-fruit, jaca	India	Río Piedras and probably other areas; less than 1000 plants	1500–2500 mm	5.0–7.0 NO M	1R
Averrhoa carambola L.	Carambola	East Indies	Near cultivated trees; less than 1000 plants	1600–2500 mm	5.0–7.0 NO P, M	1R
Bambusa vulgaris Schrad. ex Wendl.	Giant bamboo	Tropical Asia	Moist areas; more than 1000 hectares	1500–3800 mm	4.5–7.0 N– P, M	2I
Bauhinia monandra Kurz	Butterfly bauhinia, mariposa	Southeast Asia	Near homesites; more than 1000 plants	900–2000 mm	5.0–7.5 NO M	1I
Bauhinia multinervis (Kunth) BC.	Bauhinia	Northern South America	Río Piedras; less than 1000 plants	1500–2500 mm	5.0–7.0 NO M	4C
Bauhinia purpurea L.	Purple bauhinia	India to China	Near homes; more than 1000 plants	1500–2500 mm	5.0–7.0 NO M	1R
Bauhinia tomentosa L.	Mariposa, petan	Tropical Africa and Asia	Near ornamental plantings; less than 1000 plants	1500–2000 mm	5.0–7.0 NO M	1R
Bauhinia variegata L.	Poor-man's orchid, palo de orquideas	India to China	Moist and dry areas; more than 1000 plants	750–2000 mm	5.0–8.0 NO M, D	2I
Bixa orellana L.	Anatto, achiote	Continental Tropical America	Foothills and mountains; more than 1000 plants	1250–2000 mm	5.0–7.5 NO M	1I
Caesalpina pulcherrima (L.) Sw.	Barbados pride, clavellina	South American	Near ornamental plantings; more than 1000 plants	800–1900 mm	5.5–7.5 NO M, D	1R

Table 1—*Naturalized and escaped exotic trees in Puerto Rico—Continued*

Scientific name	Common name	Area of origin	Location of reproduction; number of plants or area covered	Requirements		Rate of spread[†]
				Rainfall	Soil properties[*]	
Calliandra surinamensis Benth.	Surinam calliadra, calliadra de Surinám	Northern South America	Cayey; less than 100 plants	1500–2200 mm	4.5–7.0 NO M	1I
Calophyllum inophyllum L.	Maria grande	India to Oceania	Río Piedras; less than 100 plants	1500–2500 mm	5.0–7.5 NO M	1R
Cananga odorata (Lam.) Hook. F. & Thoms.	Ilan-ilan	India to western Pacific Islands	Palmer; less than 100 plants	1800–3000 mm	5.0–7.0 NO P, M	1R
Carapa guianensis Aubl.	Crabwood	Antilles, Belize to Brazil	Two sites in the Luquillo Mountains; less than 100 plants	2000–3000 mm	4.5–7.0 NO P, M	2I
Castilla elastica Cerv.	Castilla rubber, caucho	Mexico to Ecuador	Several sites near Utuado; less than 100 hectares	1500–2500 mm	5.5–7.0 NO M	2C
Casuarina equisetifolia J. R. & G. Forst.	She-oak, casuarina	Australia, East Indies, and Southeast Asia	Coastal plains and foothills; less than 100 hectares	1250–2000 mm	5.5–8.0 N– M, D	2C
Chrysalidocarpus lutescens (Bory) Wendl.	Madagascar-palm, palma arica	Madagascar	Moist urban areas; more than 1000 plants	1500–2500 mm	5.0–7.0 N– M	3I
Citrus aurantifolia (Christm.) Swingle	Lime, lima	East Indian Archipelago	Low elevations, Puerto Rico and offshore islands; more than 1000 plants	900–2000 mm	5.5–8.0 NO M, D	1I
Citrus aurantium L.	Sour orange, naranja agrida	Southeast Asia	Lower mountains and moist limestone hills; more than 1000 plants	1500–3250 mm	4.5–7.5 NO P, M	3I
Citrus limon (L.) Burm. f.	Lemon, limón de cabra	Southeast Asia	Luquillo and Central Mountains; more than 1000 plants	1775–3250 mm	4.5–7.0 NO P, M	3I
Citrus medica L.	Citron, cidra	Southeast Asia	Abandoned farms in mountains; more than 1000 plants	2000–3000 mm	4.8–7.0 NO P, M	1I
Citrus sinensis (L.) Osbeck	Orange, china	China and Southeast Asia	Moist foothills and mountains; more than 1000 plants	1500–3100 mm	4.5–8.0 NO P, M	3R
Citrus X paradisi Macfad.	Grapefruit, toronja	Recent origin: West Indies	Moist foothills and mountains; more than 1000 plants	1400–3200 mm	4.5–7.5 NO P, M	1I
Clitoria fairchildiana R. Howard	Clitoria	Brazil	One site in Luquillo Mountains; less than 1000 plants	1500–3000mm	4.5–7.0 N– P, M	2C
Cnidoscolus aconitifolius (Miller) I. M. Johnst.	Papayuelo	Mexico and Central America	Widespread; more than 1000 plants	1000–2500 mm	5.0–7.5 N– P, M, D	2I
Cochlospermum vitifolium (Willd.) K. Spreng.	Brazilian rose	Mexico to Brazil	Near ornamental trees; less than 1000 plants	1200–2200 mm	5.0–7.5 NO M	1R

Table 1—*Naturalized and escaped exotic trees in Puerto Rico*—Continued

Scientific name	Common name	Area of origin	Location of reproduction; number of plants or area covered	Requirements		Rate of spread[†]
				Rainfall	Soil properties[•]	
Cocos nucifera L.	Coconut, coco	Probably Pacific Islands to India	Coastal areas and foothills; less than 1000 hectares	700–2500 mm	5.5–8.0 NO P, M	2I
Codiaeum variegatum (L.) Bl.	Garden croton, periquito	Sunda Islands	Near ornamentals; less than 1000 plants	1200–2500 mm	4.5–7.5 NO M	1R
Coffea arabica L.	Coffee, café	Abyssinia	Former plantations in foothills and mountains; more than 1000 hectares	1500–3000 mm	4.8–7.5 NO P, M	2C
Copaifera officinalis L.	Copaiba	Northern South America	Río Piedras; less than 100 plants	1400–2500 mm	5.0–7.0 NO M	3I
Cordia obliqua Willd.	Manjack, cereza blanca	India	Fajardo and Vega Baja; less than 10 hectares	1000–1800 mm	5.5–7.5 NO M	2C
Cordia sebestena L.	Geiger tree, anaconda	Tropical America	South coastal plain; less than 1000 plants	750–1300 mm	6.0–8.0 N– M, P	1R
Cupressus lusitanica Mill.	Mexican cypress, cipres	Mexico and Central America	Several sites in Central Mountains; more than 1000 plants	1400–2300 mm	5.0–6.5 N– M	2I
Dalbergia sissoo Roxb.	India rosewood, sisu	India	Lajas, Cayey, and Villalba ; less than 1000 plants	750–1600 mm	5.5–8.5 N– M, D	2C
Dialium guianensis (Aubl.) Steud.	Tamarindo de monte	Guatemala to Brazil	Río Piedras; less than 100 plants	1700–3000 mm	5.0–7.0 NO P, M	2I
Delonix regia (Bojer ex Hook.) Raf.	Flamboyant tree, flamboyán	Madagascar	Widespread, near mature trees; less than 100 hectares	650–2000 mm	5.5–8.0 N– M, D	2C
Enterolobium cyclocarpum (Jacq.) Griseb.	Monkey earpod, guanacaste	Mexico to northern South America	Widespread, near ornamental trees; more than 1000 plants	900–2000 mm	5.0–7.5 N– M, D	2C
Erythrina berteroana Urban	Bucayo enano machette	Mexico to Colombia	Near fencerow trees in Central Mountains; more than 1000 plants	1400–2300 mm	5.0–7.5 NO M	1R
Erythrina fusca Lour.	Immortelle, búcare	West Indies, Mexico to Brazil	North coastal plain; less than 100 hectares	1600–3000 mm	4.5–7.5 NO P, M	2I
Erythrina poeppigiana (Walp.) O. F. Cook	Mountain immortelle, bucayo	Panama to Brazil	Moist foothills and mountains; less than 1000 hectares	1600–2250 mm	5.0–7.5 N+ M	2I
Eucalyptus robusta J. E. Smith	Swamp mahogany, robusta	Eastern Australia	Toro Negro; less than 1000 plants	1500–3000 mm	4.5–6.5 N– P, M	1R
Fraxinus uhdei (Wensig) Lingelsh.	Tropical ash, fresno	Mexico and Central America	Three areas in the Central Mountains; more than 1000 plants	2000–3000 mm	4.5–7.5 NO P, M	2I

Table 1—*Naturalized and escaped exotic trees in Puerto Rico—Continued*

Scientific name	Common name	Area of origin	Location of reproduction; number of plants or area covered	Requirements		Rate of spread[†]
				Rainfall	Soil properties[*]	
Funtumia elastica (Preuss) Stapf.	Lagos-rubber, goma	Western Africa	Mayaguez; less than 1000 plants	1400–2000 mm	5.0–7.0 NO M	2C
Gliricidia sepium (Jacq.) Kunth ex Walp.	Mother of cocoa, mata raton	Mexico to northern South America	Foothills and coastal plain; more than 1000 plants	1000–1900 mm	5.0–7.5 NO M, D	1I
Haematoxylum campechianum L.	Logwood, campeche	Mexico, Guatemala, and Belize	Southern coast and foothills and Mona Island; less than 100 hectares	650–1200 mm	5.5–8.0 NO M, D	2C
Hibiscus pernambucensis Arruda	Sea hibiscus, emajagua	Probably South America	River mouths and old farms; less than 100 hectares	1600–3500 mm	4.5–7.5 NO P, M	2I
Hibiscus elatus Sw.	Blue mahoe, majo	Cuba and Jamaica	Many sites, mountains and foothills; less than 1000 hectares	1500–3500 mm	4.5–7.5 NO P, M	2C
Inga quaternata Poepp. & Endl.	Guama Venezolano	Central and South America	Central Mountains; less than 1000 hectares	1600–3400 mm	4.8–7.0 NO P, M	2I
Jatropha curcas L.	Physic-nut, tártago	Central and South America	Widespread; more than 1000 plants	1000–2000 mm	5.0–8.0 NO P, M, D	1I
Khaya nyasica Stapf. ex Baker f.	East African mahogany	East and central Africa	Río Piedras; less than 1000 plants	1200–2000 mm	5.0–7.0 NO P, M	2R
Khaya senegalensis Juss.	Dry-zone mahogany	Central Africa	Humacao; less than 1000 plants	800–1900 mm	5.0–7.5 N– P, M, D	2R
Luehea speciosa Willd.	Guásima verde	Cuba, and Mexico to northern South America	Cambalache; more than 1000 plants	1300–1900 mm	5.0–7.5 NO M, D	2I to C
Lysiloma latisiliqua (L.) Benth.	Dormido	Cuba, Florida, Bahamas, Mexico, Belize	Cambalache; less than 10 hectares	900–1775 mm	5.0–7.5 NO M, D	2C to A
Maesopsis eminii Engl.	Musizi	Central and west Africa	Luquillo and Central Mountains; less than 100 hectares	1500–3100 mm	4.5–7.5 NO P, M	4C to A
Malpighia emarginata Sessé & Moc. ex DC.	Acerola	West Indies and northern South America	Near cultivated trees; more than 1000 plants	1300–2200 mm	5.0–7.5 NO M	1I
Mangifera indica L.	Mango	India to Vietnam	Widespread on abandoned farms; less than 1000 hectares	1000–2600 mm	4.5–7.5 NO P, M, D	2C
Melia azedarach L.	Chinaberry, alelaila	Iran to China	Widely distributed; more than 1000 plants	900–1900 mm	5.0–8.0 NO M, D	2I
Melicoccus bijugatus Jacq.	Spanish lime, quenepa	Northern South America	Near roads and houses; more than 1000 plants	750–1775 mm	5.5–8.0 NO M, D	2I to C

Table 1—*Naturalized and escaped exotic trees in Puerto Rico—Continued*

Scientific name	Common name	Area of origin	Location of reproduction; number of plants or area covered	Requirements		Rate of spread[†]
				Rainfall	Soil properties[*]	
Mimosa arenosa (Willd.) Poir.	Ñarauli	Venezuela	Ceiba; less than 10 hectares	1000–1600 mm	4.5–7.0 N– M	4C
Morinda citrifolia L.	Painkiller, morinda	India to Australia	North coastal areas; less than 100 hectares	1500–2000 mm	6.0–8.0 NO P, M	1I
Moringa oleifera Lam.	Horseradish-tree, ángela	India to East Indies	Infrequent in low elevation areas; more than 1000 plants	1000–1800 mm	5.5–7.5 NO M, D	1I
Morus nigra L.	Black mulberry, mora	Iran	North coast and Central Mountains; less than 1000 plants	1400–2500 mm	5.5–7.5 NO M	1I
Muntingia calabura L.	Capulín	Mexico to Venezuela	Moist coastal areas, valleys, and foothills; less than 100 hectares	1200–2000 mm	5.0–7.5 NO M, D	4A
Myroxylon balsamum (L.) Harms	Bálsamo	Mexico to Bolivia	One site in Cupey Alto; less than 1000 plants	1700–3000 mm	4.5–7.0 NO P, M	2I
Oncoba echinata Oliver	Gorli, oncoba	Tropical Africa	Mayaguez; less than 1000 plants	1400–2000 mm	5.0–7.0 NO M	2I
Parkia timoriana (DC.) Merrill	Parkia	Indonesia	Mayaguez and Río Piedras; less than 100 plants	1500–2500 mm	5.0–7.0 NO P, M	2I
Parkinsonia aculeata L.	Jerusalem thorn, palo rayo	Texas, Arizona, and Mexico	Southeast coastal plain; less than 100 hectares	650–1000 mm	6.0–8.5 N– P, M	2I
Peltophorum pterocarpum (DC.) Back. & Heyne	Yellow flamboyant	India to Australia and Philippines	Widespread, near ornamental trees; more than 1000 plants	1000–2000 mm	5.5–7.5 NO M	2C
Persea americana (L.) Cockerell	Avocado, aguacate	Mexico and Central America	Moist areas, especially limestone hills; more than 1000 plants	1000–2500 mm	5.0–7.5 N+ M	1I
Phyllanthus acidus (L.) Skeels	Grosella, Otaheiti gooseberry	South America	Widespread, near houses and roads; more than 1000 plants	1300–2000 mm	5.0–7.5 NO N	1I
Pinus caribaea Morelet	Caribbean pine	Central America	Moist foothills and mountains; less than 10 hectares	1000–2500 mm	4.5–6.5 N– P, M	2I
Pithecellobium dulce (Roxb.) Benth.	Madras thorn, guamá Americana	Mexico to Venezuela	North and south coastal areas; less than 1000 hectares	750–1700 mm	5.5–9.0 N– P, M, D	4C
Prosopis pallida (H. & B. ex Willd.) HBK.	Mesquite, bayahonda	South America	Dry areas and offshore islands; more than 1000 hectares	650–1200 mm	5.5–9.0 N– P, M, D	4A
Pterocarpus indicus Willd.	India padauk, terocarpus	Malaya, Indonesia, and Philippines	Río Piedras and Luquillo Mountains; less than 1000 plants	1500–3200 mm	4.5–7.0 NO P, M	2I

Table 1—*Naturalized and escaped exotic trees in Puerto Rico—Continued*

Scientific name	Common name	Area of origin	Location of reproduction; number of plants or area covered	Requirements		Rate of spread[†]
				Rainfall	Soil properties[*]	
Pterocarpus macrocarpus Kurz	Burma padauk, terocarpus	Indochina	Widespread, near ornamental trees; more than 1000 plants	1000–2000 mm	5.5–8.0 NO M, D	3C
Samanea saman (Jacq.) Merrill	Raintree, samán	Mexico to Bolivia	South foothills and Vieques; less than 10 hectares	900–1500 mm	6.0–7.5 NO M	3I
Schinus terebinthifolius Raddi	Schinus	Brazil, Paraguay, and Argentina	Limestone hills; less than 100 plants	1400–2000 mm	5.5–7.5 NO M	1I
Schizolobium parahybum(Vell.) Blake	Brazilian fire tree, faveira	Central and South America	Luquillo Mountains, Utuado, and Jayuya; less than 100 plants	1000–1800 mm	5.0–7.5 NO M	1R
Senna multijuga (L. C. Rich.) Irwin & Barneby	Cassia	South America	Western Puerto Rico; less than 100 plants	1500–2000 mm	5.0–7.0 NO M	4C
Senna siamea (Lam.) Irwin & Barnaby	Siamese cassia, cassia de siam	India, Malaya, and East Indies	Widespread, near planted trees; less than 100 hectares	1000–2250 mm	5.0–8.0 NO M, D	2C
Senna spectabilis (L. C. Rich.) Irwin & Barneby	Yellow shower	Southern Mexico to northern South America	South and west-central Puerto Rico; less than 100 hectares	800–1700 mm	5.0–8.0 N– P, M	3A
Sesbania grandiflora (L.) Pers.	Sesbania, bucalo	Tropical Asia and Australia	North Coastal plain and foothills; more than 1000 plants	1500–2500 mm	5.5–7.5 NO M	1I
Simarouba amara Aubl.	Aceituno	Central and South America	Luquillo Mountains; less than 100 hectares	1900–3300 mm	4.5–7.0 NO P, M	4C
Spathodea campanulata Beauv.	African tulip tree, tulipan	Equatorial Africa	Widespread, especially north-central foothills; more than 1000 hectares	1300–2500 mm	4.5–8.0 NO P, M	4A
Spondias dulcis Parkinson	Golden-apple, jobo	Society Islands	Several sites across Puerto Rico; less than 1000 plants	1200–2200 mm	5.0–7.5 NO P, M	1R
Spondias purpurea L.	Spanish plum, ciruela	Central and South America	South coastal plain; less than 1000 plants	1000–1800 mm	5.5–7.5 NO M	1R
Sterculia apetala (Jacq.) Karst.	Panama tree, anacaguita	Southern Mexico to Peru	Coastal plain and foothills; more than 1000 plants	750–1800 mm	5.0–8.0 NO M, D	3C
Sterculia foetida L.	Hazel sterculia, anacaguita	Tropical Asia and East Indies	Mayaguez; less than 1000 plants	1200–2000 mm	5.5–7.5 NO M	2I
Swietenia mahagoni (L.) Jacq.	Mahogany, caoba Dominicana	Florida to Hispañiola	Many sites, especially limestone hills, and Guánica; less than 1000 hectares	650–1750 mm	5.0–7.5 N– M, D	2C
Swietenia macrophylla G. King	Honduran mahogany, caoba	Mexico to Peru	Moist areas, near plantations; less than 1000 hectares	1500–2500 mm	5.0–7.5 NO P, M	2C

Table 1—*Naturalized and escaped exotic trees in Puerto Rico—Continued*

Scientific name	Common name	Area of origin	Location of reproduction; number of plants or area covered	Requirements		Rate of spread†
				Rainfall	Soil properties*	
Syzygium jambos (L.) Alst.	Rose-apple, pomarrosa	Probably Malaya	Widespread in moist and wet forests; less than 1000 hectares	1700–3500 mm	4.5–7.5 NO P, M	4A
Syzygium malaccense (L.) Merr. & Perry	Malay-apple, manzana malaya	Malaya	Widespread, especially limestone hills; more than 1000 plants	1500–2750 mm	4.5–7.5 NO P, M	1I
Tabebuia chrysantha (Jacq.) Nichols.	Roble amarillo	Grenada to Trinidad	Near urban plantings; less than 1000 plants	1300–2000 mm	5.0–7.5 NO M	1I
Tabebuia donnell-smithii Rose	Primavera	Mexico and Guatemala	Luquillo Mountains; less than 1000 plants	1500–2300 mm	5.0–7.5 NO M	2I
Tamarindus indica L.	Tamarind, tamarindo	North-central Africa	Southern coastal plain, foothills, and offshore islands; more than 1000 plants	750–1400 mm	6.0–8.5 N– P, M, D	3C
Tectona grandis L. f.	Teak, teca	India through Indochina	Limestone hills; less than 10 hectares	1300–1900 mm	5.0–7.5 NO M	1I
Terminalia catappa L.	India almond, almendra	Malaya to Oceania	Sandy coastal plains and foothills; less than 1000 hectares	1300–2000 mm	5.5–8.5 NO P, M, D	3C
Terminalia ivorensis A. Chev.	Idigbo	West Africa	Luquillo and Central Mountains; less than 1000 plants	1500–3000 mm	4.5–7.5 NO P, M	2C
Terminalia myriocarpa Heurck & Muell.-Arg.	Jhalna	India	Maricao; less than 100 plants	1700–2500 mm	4.5–7.0 N– M	2I
Terminalia oblonga (R. & P.) Steud.	Guayabo volador	Mexico	Río Piedras; less than 100 plants	1400–2200 mm	5.0–7.0 NO M	1I
Theobroma cacao L.	Cacao	Mexico and Central America	Near old plantations; more than 1000 plants	1700–3100 mm	5.0–7.5 N+ P, M	1I
Thespesia populnea (L.) Soland. ex Correa	Portia tree, emajaguilla	Old World Tropics	Widespread in coastal areas; less than 1000 hectares	650–1600 mm	6.0–9.0 N– P, M, D	2C
Thevetia peruviana (Pres.) K. Schum.	Lucky nut, cabadonga	Tropical America	North coastal plain; more than 1000 plants	800–1400 mm	6.0–8.0 NO P, M	2I
Triplaris spp.	Triplaris, triplaria	South America	Near ornamental trees; less than 1000 plants	1400–2200 mm	5.0–7.0 NO M	2I
Ziziphus mauritiana Lam.	Jujube, aprin	India and Southeast Asia	Coastal plains and offshore islands; more than 1000 plants	800–1900 mm	5.0–7.5 N M, D	1I

*Range of soil properties under which natural reproduction is estimated to occur in Puerto Rico. First line: range of pH. Second line: soil nutrient status: N+ = demands nutrient-rich sites; N– = tolerates soils low in essential nutrients; NO = adapted to medium fertility soils; does not tolerate nutrient-poor sites. Third line: tolerance of soil internal drainage: D = soil droughty due to excess drainage; M = soil profile well drained but moist; P = soil profile poorly drained, subsoil anaerobic.

†Rate of spread and aggressiveness of reproduction: 1 = Slow spread and infrequent reproduction, 2 = Slow spread and abundant reproduction, 3 = Rapid spread and infrequent reproduction, 4 = Rapid spread and abundant reproduction; and eventual abundance: A = Abundant, C = Common, I = Infrequent or confined to limited habitat (less than 100 hectares), R = Rare.

Table 2.—*Exotic tree species already common or abundant, widespread, and competing in primary or secondary forest stands*

Scientific name	Common name
Acacia farnesiana (L.) Willd.	Sweet acacia, aroma
Albizia lebbeck (L.) Benth.	Lebbek, tibet
Albizia procera (Roxb.) Benth.	White seris, albizia
Ardisia solanacea Roxb.	Blackberry
Artocarpus altilis (S. Park.) Fosb.	Breadfruit, pana
Coffea arabica L.	Coffee, café
Delonix regia (Bojer ex Hook.) Raf.	Flamboyant tree, flamboyán
Mangifera indica L.	Mango
Muntingia calabura L.	Capulin
Pithecellobium dulce (Roxb.) Benth.	Madras thorn, guamá americana
Prosopis pallida (H. & B. ex Willd.) HBK.	Mesquite, bayahonda
Senna siamea (Lam.) Irwin & Barnaby	Siamese cassia, cassia
Spathodea campanulata Beauv.	African tulip tree, tulipán
Syzygium jambos (L.) Alst.	Rose-apple, pomarrosa
Terminalia catappa L.	India almond, almendra
Thespesia populnea (L.) Soland ex Correa	Portia tree, emajaguilla

Table 3—*Exotic tree species that have been able to regenerate and compete in forest stands and are likely to become common or abundant within the next century*

Scientific name	Common name
Albizia adinocephala (Donn. Sm.) Britt & Rose	Chipite
Castilla elastica Cerv.	Castilla rubber, caucho
Casuarina equisetifolia J. R. & G. Forst.	She-oak, casuarina
Haematoxylon campechianum L.	Logwood, campeche
Hibiscus elatus Sw.	Blue mahoe, majo
Lysiloma latisiliqua (L.) Benth.	Dormido
Maesopsis eminii Engl.	Musizi
Melicoccus bijugatus Jacq.	Spanish lime, quenepa
Mimosa arenosa (Willd.) Poir	Ñarauli
Pterocarpus macrocarpus Kuez	Burma padauk, terocarpus
Senna mutijuga (L. C. Rich.) Irwin & Barneby	Cassia
Senna spectabilis (L. C. Rich.) Irwin & Barneby	Yellow shower
Simarouba amara Aubl.	Aceituno
Sterculia apetala (Jacq.) Karst.	Panama tree, anacaguita
Swietenia mahagoni (L.) Jacq.	Mahogany, caoba Dominicana
Tamarindus indica L.	Tamarind, tamarindo

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Many exotic tree species have been imported into Puerto Rico for their wood, fruit, and use as coffee shade and ornamentals. Species that are abundant, widespread, and competing in natural stands, as well as those likely to do so in the future, are identified.

Keywords: Escaped species, introduced species, reproduction, tree flora.

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